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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,182	07/08/2003	Jong Hoon Kim	123034-05004928	7113
43569	7590	05/04/2005	EXAMINER	
MAYER, BROWN, ROWE & MAW LLP 1909 K STREET, N.W. WASHINGTON, DC 20006			GHYKA, ALEXANDER G	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/614,182

Applicant(s)

KIM ET AL.

Examiner

Olivia T. Luk

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/10/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 102(a) as being anticipated by Hong et al. (1020020017795 A).

In re claim 1, Hong et al. discloses providing a semiconductor substrate **30** (page 6; last paragraph) in which a lower film is formed **31**; coating a first photoresist film **32** on the lower film **31**; depositing a second photoresist film **33** having a higher glass transition temperature than the first photoresist film **31** on the first photoresist film **31** (page 7; first paragraph); patterning the second photoresist film and the first photoresist film by an exposure process and a wet development process (page 7; last paragraph), thereby forming a first photoresist film pattern and second photoresist film pattern defining a first contact hole therethrough (page 7; third paragraph; Fig. 3b); implementing RFP to cause the first and second photoresist film patterns to flow so that the first contact hole changes to a second contact hole having a lower critical dimension than the first contact hole (page 8; second paragraph); and implementing an etch process using the second photoresist film pattern as an etch mask for the lower film pattern the lower film (page 7; second and third paragraphs).

Art Unit: 2812

In re claim 2, Hong et al. discloses the lower film is formed using TiN, SiON, Si<sub>3</sub>N<sub>4</sub>, organic anti-reflection coating of amorphous carbon series or an inorganic anti-reflection coating (page 7, first paragraph).

In re claim 3, Hong et al. discloses the difference in a glass transition temperature between the first photoresist and the second photoresist film is 1-10°C (page 7, line 1).

In re claim 4, Hong et al. discloses the first photoresist film and the second photoresist film have the same physical properties other than the glass transition temperature (page 7, first paragraph).

In re claim 6, Hong et al. discloses the second photoresist film coated in thickness of 0.5μm (page 8; second paragraph).

In re claim 7, Hong et al. discloses the exposure process employs I-line, KrF, ArF, EUV, E-beam or X-ray as a photoresist (page 3; last paragraph).

In re claim 8, Hong et al. discloses during the RFP, a heating time is 50 - 200 seconds (page 8; second paragraph).

In re claim 9, Hong et al. discloses the RFP is implemented at a temperature of 132°C for 90 seconds (page 8; second paragraph).

In re claim 10, Hong et al. discloses the critical dimension of the first photoresist film pattern is 0.20μm (page 8; second paragraph).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2812

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al. (1020020017795 A).

In re claim 5, Hong et al. discloses the claimed invention except for the first photoresist film is coated in thickness of 0.1 $\mu$ m. Hong et al. teaches first photoresist film is coated in thickness of 0.08  $\mu$ m.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the first photoresist film at 0.1 $\mu$ m, since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

In re claim 11, Hong et al. discloses the claimed invention except for the critical dimension of the second photoresist film is 0.13 $\mu$ m. Hong et al. teaches the critical dimension of the second photoresist film is about 0.12 $\mu$ m.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the critical dimension of the second photoresist film is 0.13 $\mu$ m, since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

***Response to Arguments***

5. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olivia T. Luk whose telephone number is 571-272-1676. The examiner can normally be reached on 8AM to 5PM Mon-Fri.

Art Unit: 2812

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

OTL  
April 26, 2005



**MICHAEL LEBENTRITT**  
**SUPERVISORY PATENT EXAMINER**